Boostcap Ultracapacitors

by

Maxwell TECHNOLOGIES™

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MAXWELL TECHNOLOGIES® BOOSTCAP® ULTRACAPACITORS

Product Image	Product Name	Capacitance (F)	Rated Voltage (V)	Surge Voltage (V)	ESR, DC (mohm)	ESR 1kHz (mohm)	Ic (mA)	Max. current (A), 1 sec	Max. continuous current (A)	Weight (kg)	Emax (Wh/kg)	Pmax (W/kg)	Balancing	Terminal	Thermal Monitoring	Protection Level
	PC10	10	2.5	2.7	180	130	0.04	19	2.5	0.0063	2.5	1,900	N/A	Lead	N/A	-
	BCAP0005 P270	5	2.7	2.85	200	110	0.015	3.4	1.6	0.0022	2.2	7,500	N/A	Lead	N/A	-
	BCAP0010 P270	10	2.7	2.85	80	60	0.03	7.5	3.5	0.004	2.3	7,550	N/A	Lead	N/A	-
	BCAP0025 P270	25	2.7	2.85	42	30	0.045	16.5	5	0.007	3.62	8,678	N/A	Radial lead	N/A	-
	BCAP0050 P270	50	2.7	2.85	20	15	0.075	33.7	7.1	0.014	3.62	8,678	N/A	Radial lead	N/A	-
	BCAP0100 P270	100	2.7	2.85	15	9	0.26	54	8.2	0.025	4.05	8,100	N/A	Snap In	N/A	-
	BCAP0150 P270	150	2.7	2.85	14	8	0.5	65.3	9.1	0.035	4.34	6,509	N/A	Snap in	N/A	-
	BCAP0310 P270 T08	310	2.7	2.85	2.2	1.1	0.45	240	30	0.062	5.06	26,700	N/A	Radial	N/A	-
	BCAP0350 E270 T09	350	2.7	2.85	3.2	1.6	0.3	220	25	0.063	5.62	18,300	N/A	Radial	N/A	-
	BCAP0650 P270 K04	650	2.7	2.8	0.8	0.6	1.5	585	105	0.16	3.29	15,100	N/A	Threaded	N/A	-
	BCAP0650 P270 K05 / K06	650	2.7	2.8	0.8	0.6	1.5	585	105	0.16	3.29	15,100	N/A	Weldable	N/A	-
	BCAP1200 P270 K04	1200	2.7	2.8	0.58	0.44	2.7	975	110	0.26	4.05	13,800	N/A	Threaded	N/A	-
	BCAP1200 P270 K05 / K06	1200	2.7	2.8	0.58	0.44	2.7	975	110	0.26	4.05	13,800	N/A	Weldable	N/A	-
	BCAP1500 P270 K04	1500	2.7	2.8	0.47	0.35	3.0	1,210	115	0.28	4.75	16,200	N/A	Threaded	N/A	-
	BCAP1500 P270 K05 / K06	1500	2.7	2.8	0.47	0.35	3.0	1,210	115	0.28	4.75	16,200	N/A	Weldable	N/A	-
	BCAP2000 P270 K04	2000	2.7	2.8	0.35	0.26	4.2	1,620	125	0.36	5.06	17,500	N/A	Threaded	N/A	-
	BCAP2000 P270 K05 / K06	2000	2.7	2.8	0.35	0.26	4.2	1,620	125	0.36	5.06	17,500	N/A	Weldable	N/A	-
	BCAP3000 P270 K04	3000	2.7	2.8	0.29	0.24	5.2	2,215	150	0.51	5.52	13,800	N/A	Threaded	N/A	-
	BCAP3000 P270 K05 / K06	3000	2.7	2.8	0.29	0.24	5.2	2,215	150	0.51	5.52	13,800	N/A	Weldable	N/A	-

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MODULES

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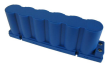
MAXWELL TECHNOLOGIES® BOOSTCAP® ULTRACAPACITORS

Product Image	Product Name	Capacitance (F)	Rated Voltage (V)	Surge Voltage (V)	ESR, DC (mohm)	ESR 1kHz (mohm)	Ic (mA)	Max. current (A), 1 sec	Max. continuous current (A)	Weight (kg)	Emax (Wh/kg)	Pmax (W/kg)	Balancing	Terminal	Thermal Monitoring	Protection Level
	BMOD0058 E016 B02	58	16.2	16.2	22	10	50	200	20	0.55	2.67	8,200	Passive	Screw	N/A	-
	BMOD0110 P016	110	16.2	16.8	5.4	4	1.5	-	30	2.7	1.49	6,000	VMS	Screw	Y	IP65
	BMOD0250 P016	250	16.2	16.8	4.1	3.3	3	2,000	115	4.45	2.05	4,400	VMS	Screw	Y	IP65
	BMOD0500 P016 B01	500	16.2	16.8	2.4	1.7	5.2	4,000	150	5.75	3.17	6,700	VMS	Screw	Y	IP65
	BMOD0500 P016 B02	500	16.2	16.8	2.4	1.7	150	4,000	150	5.75	3.17	6,700	Passive	Screw	Y	IP65
	BMOD0083 P048	80	48.6	50.4	12.3	9.8	3	1,080	115	11	2.48	5,400	VMS	Screw	Y	IP65
	BMOD0110 P048	110	48.6	50.4	8.1.	5.2	4.2	1410	125	12	3,01	8,800	VMS	Screw	Y	IP65
	BMOD0165 P048	165	48.6	50.4	7.1	5.2	5.21	1,850	150	14.2	3.8	7,900	VMS	Screw	Y	IP65
	BMOD0094 P075	94	75	90	12.5	N/A	5.2	750	50	25	3.98	6,800	Passive	Screw	Y	IP54 SAEJ2380
	BMOD0063 P125	63	125	130	18	14.0	5.2	750	150	58	2.53	5,200	VMS	Radsok*	Y	IP65

For more information visit: www.alfatec.de

Stand: Okt. 2009

This flyer is printed on paper with 15% recycled content . VMS: Voltage Management System • *Radsok® is a trademark of Amphenol • The information in this document is correct at time of printing. For the latest information and product updates please visit www.maxwell.com. Images not to scale.

PC10
PC10-90
PC10-270

Now containing Maxwell Technologies patented electrode

CAPACITANCE	
Nominal capacitance	10 F
Tolerance capacitance	-10/+20%
VOLTAGE	
Rated voltage	2.5 V
Surge voltage	2.7 V
RESISTANCE	
ESR, DC Specification is as-built value. Value after test is higher. Lifespan and Cycles specifications are from as-built specification.	0.18 Ω
ESR, AC	130 mΩ
Resistance tolerance	Max.
TEMPERATURE	
Operating temperature range	-40°C to +70°C
Storage temperature range	-40°C to +85°C
POWER	
Pd	660 W/kg
Pv	1390 W/L
ENERGY	
Emax	6.9 mAh
LIFESPAN	
Lifetime ΔC < 20% decrease ESR < 100% increase	10 years (2.5V, 25°C)
Endurance ΔC < 20% decrease from rated ESR < 100% increase from rated	3,000 hours (2.5V, 70°C)
CYCLES	
Cycles	500,000
Capacitance change	ΔC < 20% decrease
Internal resistance	ESR < 100% increase
CURRENT	
Leakage current	0.04 mA
Short circuit current (Isc)	19 A
Maximum continuous current	2.5 A

SIZE	
Dimensions (L x W x H) (mm) (±0.5mm)	See drawings.
Weight	6.3g

FEATURES AND BENEFITS

- Over 500,000 duty cycles
- 10 year life capability
- Hermetically sealed, stainless steel construction
- Low profile prismatic design
- Higher energy vs. electrolytic capacitors
- Higher power vs. batteries
- UL recognized
- RoHS compliant

APPLICATIONS

- Automatic meter readers
- Automatic subsystems
- Back up power for soft shut down requirements
- Digital cameras and consumer electronics
- Wireless transmissions
- NASA space qualified

MARKINGS

Modules are marked with the following information: Rated capacitance, rated voltage, product number, name of manufacturer, positive and negative terminal, warning marking, serial number.

ADDITIONAL TECHNICAL INFORMATION

Capacitance and ESR, DC measured per document no. 1007239, available at www.maxwell.com.

I_c = leakage current after 72 hours at 25°C

Isc = short circuit current = $\frac{V_{Rated}}{ESR\ DC}$

R_{th} = thermal resistance

$$Emax = \frac{\frac{1}{2} CV^2}{3{,}600 \times mass}$$

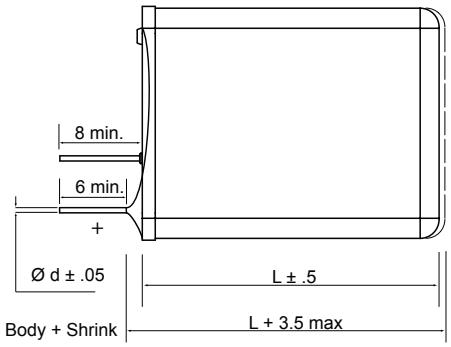
$$Pmax = \frac{\frac{V^2}{4R\ (1khz)}}{mass}$$

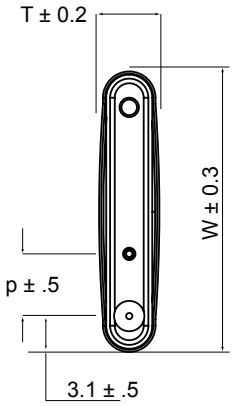
$$Pd = \frac{\frac{0.12V^2}{R\ (DC)}}{mass}$$

PC10
PC10-90
PC10-270

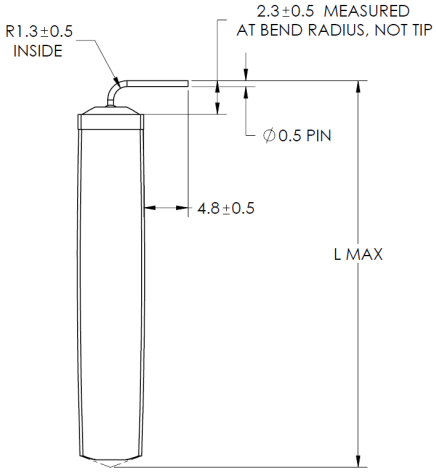
DIMENSIONS (mm)

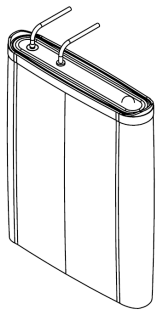
PC10



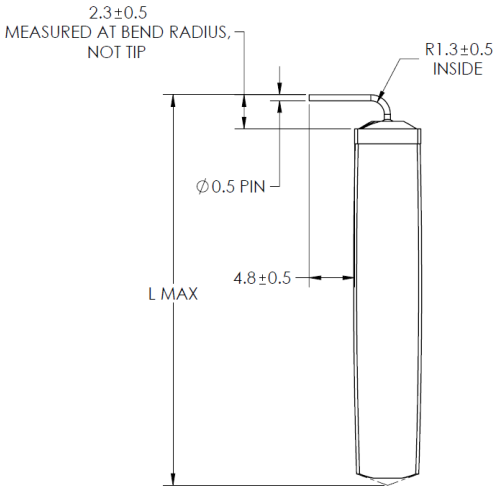


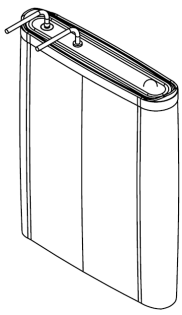
PC10-90





PC10-270





Part Description	Vol (l)	Dimensions in millimeters					Package qty.
		L	W	T	d	p	
PC10	0.003	29.6	23.6	4.8	0.5	5.1	1920
PC10-90	0.003	35.9	23.6	4.8	0.5	5.1	1824
PC10-270	0.003	35.9	23.6	4.8	0.5	5.1	1824

Product dimensions are for reference only unless otherwise identified. Product dimensions and specifications may change without notice.
Please contact Maxwell Technologies directly for any technical specifications critical to application.

MOUNTING RECOMMENDATIONS

All leads are tinned from 1.5mm of capacitor body. It is recommended that parts stay within protective packaging until ready to use. Parts may be soldered or wave soldered. Request supplemental information related to mounting instructions if necessary. Components should not be operated outside recommended limits.

BCAP0005 P270 BCAP0050 P270
BCAP0010 P270 BCAP0100 P270
BCAP0025 P270 BCAP0150 P270

TYPICAL FEATURES AND BENEFITS

- Ultra-low internal resistance
- Two pin radial lead
- Resistant against reverse polarity
- 500,000 cycles, 10 year life capability
- RoHS compliant
- Proprietary material science and packaging technology

EXAMPLE APPLICATIONS

- Consumer electronics
- Industrial and automation
- Portable power tools
- Renewable energy systems
- Short term UPS (uninterruptible power supply) and telecom systems

PRODUCT SPECIFICATIONS

CAPACITANCE	BCAP0005	BCAP0010	BCAP0025	BCAP0050	BCAP0100	BCAP0150
Nominal capacitance	5 F	10 F	25 F	50 F	100 F	150 F
Capacitance tolerance	±20%		-0% / +20%			
VOLTAGE						
Rated voltage	2.7 V DC					
Surge voltage	2.85 V DC					
RESISTANCE						
ESR, DC	200 mΩ	80 mΩ	42 mΩ	20 mΩ	15 mΩ	14 mΩ
ESR, AC	110 mΩ	60 mΩ	30 mΩ	15 mΩ	9 mΩ	8 mΩ
Resistance tolerance	Max.					
TEMPERATURE						
Operating temperature range	-40°C to +65°C					
Storage temperature range	-40°C to +70°C					
Temperature characteristics						
Capacitance change	Within ± 5% of initial measured value at 25°C (at -40°C)					
Internal resistance change	Within ± 50% of initial measured value at 25°C (at -40°C)					
POWER						
Pd	1,980 W/kg	2,730 W/kg	2,900 W/kg	3,100 W/kg	2,400 W/kg	1,700 W/kg
Pmax	7,500 W/kg	7,550 W/kg	8,600 W/kg	8,600 W/kg	8,100 W/kg	6,500 W/kg
ENERGY						
Energy density (Emax)	2.3 Wh/kg	2.53 Wh/kg	3.62 Wh/kg	3.62 Wh/kg	4.05 Wh/kg	4.34 Wh/kg
LIFESPAN						
Shelf life	After 1,000 hours storage at 65°C without load shall meet specification for endurance					
Endurance After 1,000 hours application of rated voltage at 65°C. Within % of initial specified value.						
Capacitance change	Within 30% of initial value					
Internal resistance change	Within 40% of initial value					
Life test After 10 years at rated voltage and 25°C. Within % of initial specified value.						
Capacitance change	Within 30% of initial value					
Internal resistance	Within 100% of initial value					

BCAP0005 P270 BCAP0050 P270
BCAP0010 P270 BCAP0100 P270
BCAP0025 P270 BCAP0150 P270

PRODUCT SPECIFICATIONS (cont.)

CYCLES	BCAP0005	BCAP0010	BCAP0025	BCAP0050	BCAP0100	BCAP0150
Capacitors cycled between specified voltage and half rated voltage under constant current at 25°C (500,000 cycles).						
Capacitance change	Within 30% of initial value					
Internal resistance	Within 100% of initial value					
CURRENT						
Leakage current (Ic) After 72 hours at 25°C. Initial leakage current can be higher.	0.015 mA	0.03 mA	0.045 mA	0.075 mA	0.26 mA	0.5 mA
Maximum continuous current Assuming 15°C temperature rise above ambient temperature.	1.6 A	3.5 A	4.9 A	7.1 A	8.2 A	9.1 A
Maximum peak current Maximum peak current calculations: IMAX = nominal capacitance x 0.5 (rated voltage) / 1 sec.	3.4 A	7.5 A	16.5 A	33.7 A	54.0 A	65.3 A
Short circuit current (Isc)	13.5 A	33.8 A	64.3 A	135.0 A	180.0 A	193.0 A
CONNECTION						
Terminal	Radial lead	Radial lead	Radial lead	Radial lead	Snap in	Snap in
SIZE						
Dimensions	See drawings					
Weight	2.2g	4.0g	7.0g	14.0g	25.0g	35.0g

MARKINGS

Modules are marked with the following information: Rated capacitance, rated voltage, product number, name of manufacturer, negative terminal, serial number.

ADDITIONAL TECHNICAL INFORMATION

Capacitance and ESR, DC measured per document no. 1007239, available at www.maxwell.com.

I_c = leakage current after 72 hours at 25°C

Isc = short circuit current (maximum peak current)

R_{th} = thermal resistance

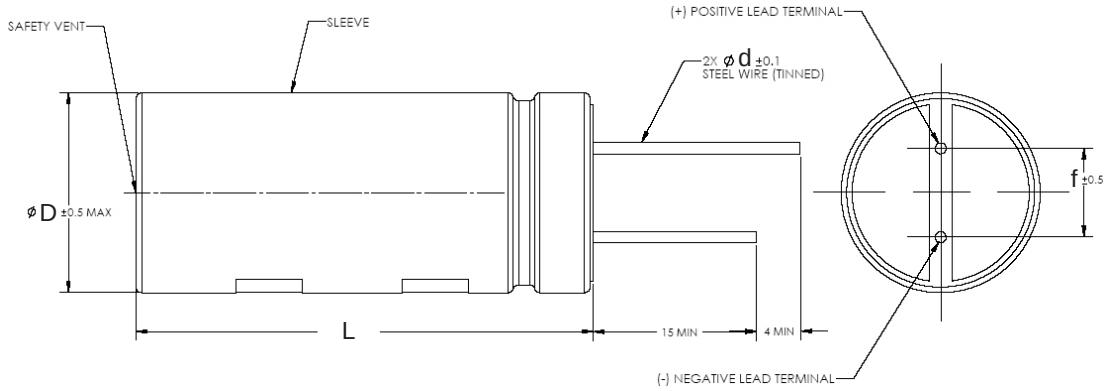
$$Emax = \frac{\frac{1}{2} CV^2}{3{,}600 \times mass}$$

$$Pmax = \frac{\frac{V^2}{4R\,(1khz)}}{mass}$$

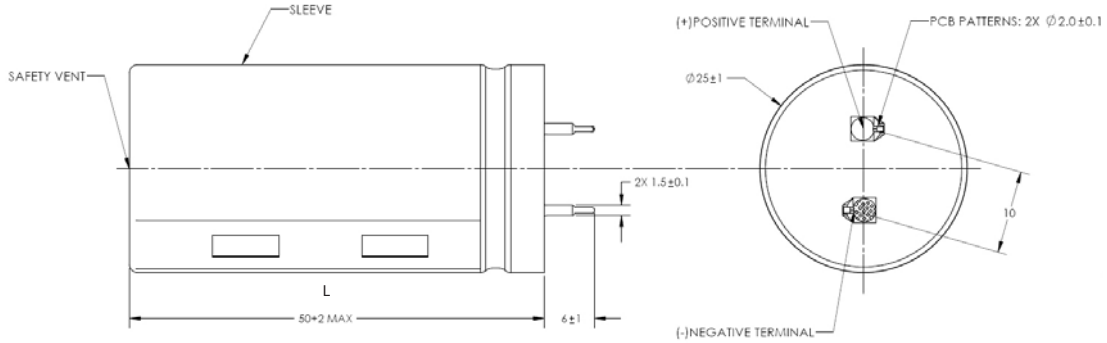
$$Pd = \frac{\frac{0.12V^2}{R\,(DC)}}{mass}$$

BCAP0005 P270 BCAP0050 P270
BCAP0010 P270 BCAP0100 P270
BCAP0025 P270 BCAP0150 P270

DIMENSIONS (mm) - BCAP0005, BCAP0010, BCAP0025, BCAP0050



DIMENSIONS (mm) - BCAP0100, BCAP0150



Part Description	Vol (øxL)	Mass (g)	Size (mm)			
			L (+2mm max)	D	d	f
BCAP0005 P270	10 x 20	2.2	20	10	0.6	5.3
BCAP0010 P270	10 x 30	4	30	10	0.6	5.3
BCAP0025 P270 T01	16 x 26	7	26	16	0.8	7.5
BCAP0050 P270 T01	18 x 41	14	41	18	0.8	7.5
BCAP0100 P270 T01	22 x 45	25	45	22	1.5	10
BCAP0150 P270 T01	25 x 50	35	50	25	1.5	10

Product dimensions are for reference only unless otherwise identified. Product dimensions and specifications may change without notice.
Please contact Maxwell Technologies directly for any technical specifications critical to application.

DATASHEET
BC POWER SERIES RADIAL D CELL 310F ULTRACAPACITOR

BCAP0310 P270 T10

FEATURES AND BENEFITS

- Round, radial mounting design for easy surface mount assembly
- Over 500,000 duty cycles
- 10 year life capability
- Ultra-low internal resistance

APPLICATIONS

- Automotive subsystems
- Industrial power back up
- Portable power tools
- Renewable energy systems

PRODUCT SPECIFICATIONS

CAPACITANCE	
Nominal capacitance	310 F
Capacitance tolerance	+20% / -0%
VOLTAGE	
Rated voltage	2.7 V DC
Surge voltage	2.85 V DC
Isolation voltage	N/A
RESISTANCE	
ESR, DC	2.2mΩ
Resistance tolerance	Max.
Thermal resistance (Rth)	10.9°C/W
TEMPERATURE	
Operating temperature range	-40°C to +65°C
Storage temperature range	-40°C to +70°C
Temperature characteristics	
Capacitance change	± 5% of value at 25°C
Internal resistance	± 150% of value at 25°C
POWER	
Pd	6,400 W/kg
ENERGY	
Emax	5.06 Wh/kg
LIFESPAN	
Endurance After 1,000 hours application of rated voltage at 65°C.	
Capacitance change	<20% decrease
Internal resistance	<25% increase
Life test After 10 years at rated voltage and 25°C.	
Capacitance change	≤20% decrease
Internal resistance	≤100% increase
CYCLES	
Cycles - Capacitors cycles between specified voltage and half rated voltage under constant current at 25°C (500,000 cycles)	
Capacitance change	≤20% decrease
Internal resistance	≤100% increase

CURRENT	
Leakage current After 72 hours at 25°C. Initial leakage current can be higher.	0.45 mA
Short circuit current (Isc) **CAUTION:** Current possible with short circuit from U_R. Do not use as an operating current.	1,220 A
Maximum continuous current	30 A
Maximum peak current, 1 sec	240 A
CONNECTION	
Terminal	Radial
SIZE	
Dimensions	See drawing
Volume	0.053 L
Mass	62g

MOUNTING RECOMMENDATIONS

Solder tabs to PCB. See application note for further information and slot spacing recommendations. For proper mounting, the use of a holder or spacer between the cell and the PCB is required.

MARKINGS

Parts are marked with the following information: Rated capacitance, rated voltage, product number, name of manufacturer, positive and negative terminal, warning marking, serial number.

ADDITIONAL TECHNICAL INFORMATION

Capacitance and ESR, DC measured per document no. 1007239, available at www.maxwell.com.

I_c = leakage current after 72 hours at 25°C

Isc (short circuit current) = $\frac{V_{RATED}}{ESR}$

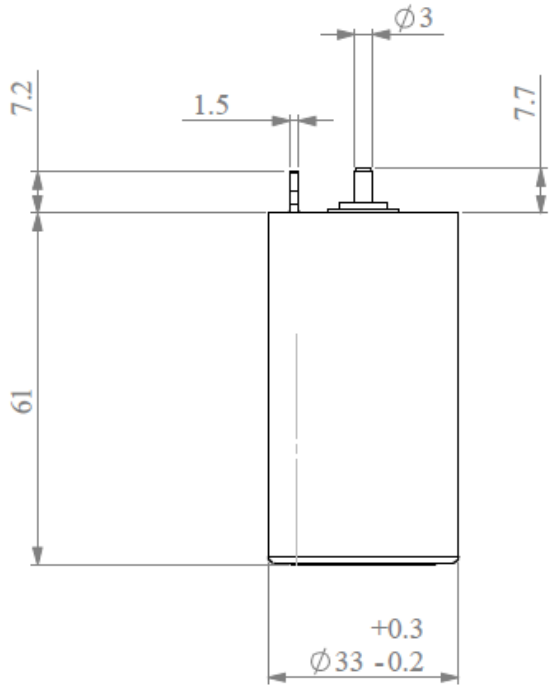
R_{th} = thermal resistance

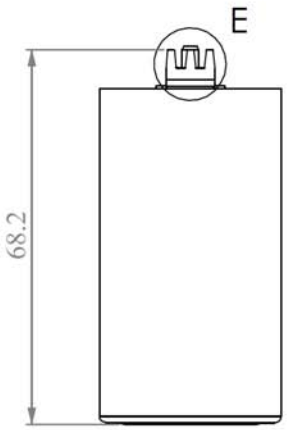
$$Emax = \frac{\frac{1}{2} CV^2}{3{,}600 \times mass}$$

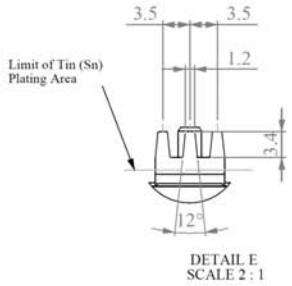
$$Pmax = \frac{\frac{V^2}{4R\ (1khz)}}{mass} \qquad Pd = \frac{\frac{0.12V^2}{R\ (DC)}}{mass}$$

BCAP0310 P270 T10

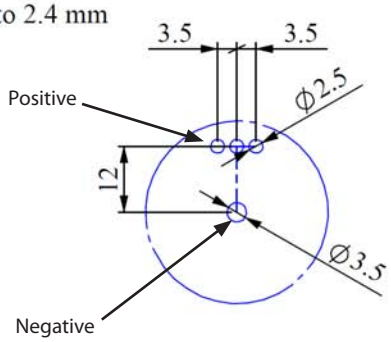
PRODUCT SPECIFICATIONS

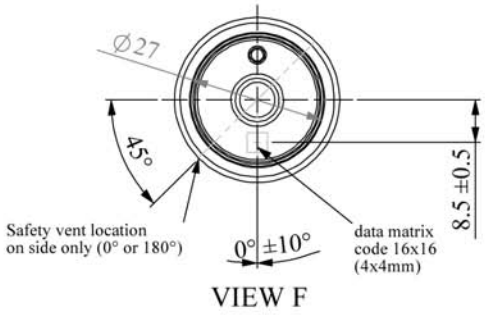






Board drillings
Board thickness : 1.5 to 2.4 mm





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DATASHEET
BC ENERGY SERIES RADIAL D CELL 350F ULTRACAPACITOR

BCAP0350 E270 T11

FEATURES AND BENEFITS

- Round, radial mounting design for easy surface mount assembly
- Over 500,000 duty cycles
- 10 year life capability
- Ultra-low internal resistance

APPLICATIONS

- Industrial power back up
- Portable power tools
- Renewable energy systems
- Short term UPS (uninterruptible power supply) and telecom applications

PRODUCT SPECIFICATIONS

CAPACITANCE	
Nominal capacitance	350 F
Capacitance tolerance	+20% / -0%
VOLTAGE	
Rated voltage	2.7 V DC
Surge voltage	2.85 V DC
Maximum operating voltage	2.7 V DC
Isolation voltage	N/A
RESISTANCE	
ESR, DC	3.2mΩ
Resistance tolerance	Max.
Thermal resistance (Rth)	10.9C/W
TEMPERATURE	
Operating temperature range	-40°C to +65°C
Storage temperature range	-40°C to +70°C
Temperature characteristics	
Capacitance change % at 25°C	± 5%
Internal resistance % at 25°C	± 150%
POWER	
Pd	4,300 W/kg
ENERGY	
Emax	5.62 Wh/kg
LIFESPAN	
Endurance After 1,000 hours application of rated voltage at 65°C.	
Capacitance change	<20% decrease
Internal resistance	<25% increase
Life test At rated voltage and 25°C.	10 years
Capacitance change	≤20% decrease
Internal resistance	≤100% increase
CYCLES	
Cycles - Capacitors cycles between specified voltage and half rated voltage under constant current at 25°C (500,000 cycles)	
Capacitance change	20% decrease
Internal resistance	100% increase
CURRENT	
Leakage current After 72 hours at 25°C. Initial leakage current can be higher.	0.3 mA
Short circuit current (Isc) **CAUTION:** Current possible with short circuit from U_R. Do not use as an operating current.	840 A
Maximum continuous current	25 A
Maximum peak current, 1 sec	220 A
CONNECTION	
Terminal	Radial
SIZE	
Dimensions	See drawing
Volume	0.053 L
Mass	63g

MOUNTING RECOMMENDATIONS

Solder tabs to PCB. See application note for further information and slot spacing recommendations.

MARKINGS

Parts are marked with the following information: Rated capacitance, rated voltage, product number, name of manufacturer, positive and negative terminal, warning marking, serial number.

ADDITIONAL TECHNICAL INFORMATION

Capacitance and ESR, DC measured per document no. 1007239, available at www.maxwell.com.

I_c = leakage current after 72 hours at 25°C

$$Isc \text{ (short circuit current)} = \frac{V_{RATED}}{ESR}$$

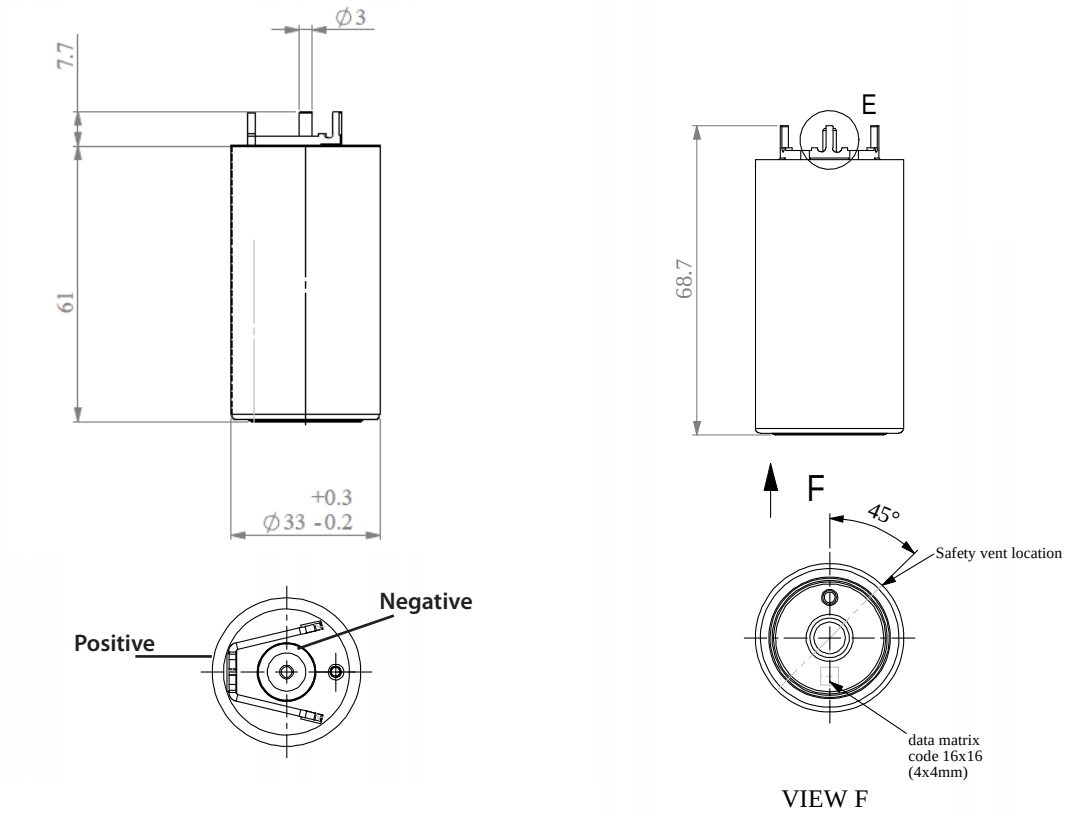
R_{th} = thermal resistance

$$Emax = \frac{\frac{1}{2} CV^2}{3{,}600 \times mass}$$

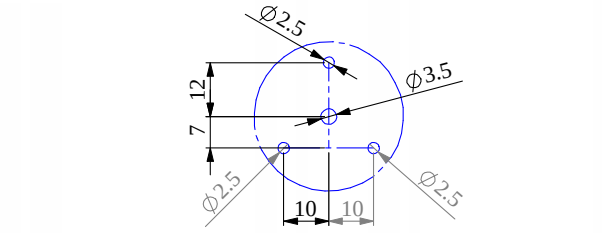
$$Pmax = \frac{\frac{V^2}{4R\ (1khz)}}{mass} \qquad Pd = \frac{\frac{0.12V^2}{R\ (DC)}}{mass}$$

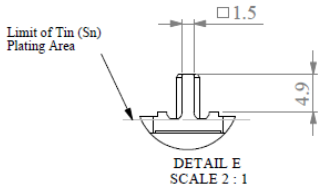
BCAP0350 E270 T11

PRODUCT SPECIFICATIONS



Board drillings





Product dimensions are for reference only unless otherwise identified. Product dimensions and specifications may change without notice.
Please contact Maxwell Technologies directly for any technical specifications critical to application.

BCAP0650 P270
BCAP1200 P270
BCAP1500 P270
BCAP2000 P270
BCAP3000 P270

FEATURES AND BENEFITS

- Ultra-low internal resistance
- Highest power performance available
- Lowest RC time constant
- 2.7 V operating voltage
- Over 1,000,000 duty cycles
- Proprietary material science and packaging technology
- Threaded terminal or weldable post versions

APPLICATIONS

- Automotive subsystems
- Back-up power
- Grid stabilization
- Hybrid drive trains
- Rail system power
- Transportation
- Utility vehicles

PRODUCT SPECIFICATIONS

CAPACITANCE	BCAP0650	BCAP1200	BCAP1500	BCAP2000	BCAP3000
Nominal capacitance	650 F	1,200 F	1,500 F	2,000 F	3,000 F
Tolerance capacitance	-0% / +20%	-0% / +20%	-0% / +20%	-0% / +20%	-0% / +20%
VOLTAGE					
Rated voltage	2.7 V DC	2.7 V DC	2.7 V DC	2.7 V DC	2.7 V DC
Surge voltage	2.85 V DC	2.85 V DC	2.85 V DC	2.85 V DC	2.85 V DC
Maximum operating voltage			N/A		
RESISTANCE					
ESR, DC Max., room temperature	0.8 mΩ	0.58 mΩ	0.47 mΩ	0.35 mΩ	0.29 mΩ
ESR, 1khz (Max.)	0.6 mΩ	0.44 mΩ	0.35 mΩ	0.26 mΩ	0.24 mΩ
TEMPERATURE					
Operating temperature range Stored uncharged	-40°C to +65°C	-40°C to +65°C	-40°C to +65°C	-40°C to +65°C	-40°C to +65°C
Storage temperature range Cell case temperature	-40°C to +70°C	-40°C to +70°C	-40°C to +70°C	-40°C to +70°C	-40°C to +70°C
POWER					
Pd	6,800 W/kg	5,800 W/kg	6,600 W/kg	6,900 W/kg	5,900 W/kg
Pmax	18,900 W/kg	15,900 W/kg	18,500 W/kg	19,400 W/kg	14,800 W/kg
ENERGY					
Emax	4.11 Wh/kg	4.67 Wh/kg	5.42 Wh/kg	5.63 Wh/kg	5.96 Wh/kg

BCAP0650 P270
BCAP1200 P270
BCAP1500 P270
BCAP2000 P270
BCAP3000 P270

PRODUCT SPECIFICATIONS (cont.)

DC LIFESPAN	BCAP0650	BCAP1200	BCAP1500	BCAP2000	BCAP3000
Endurance At rated voltage and 65°C.	1,500 hours	1,500 hours	1,500 hours	1,500 hours	1,500 hours
Capacitance change % of rated value	≤20%	≤20%	≤20%	≤20%	≤20%
Internal resistance change % of rated value	≤60%	≤60%	≤60%	≤60%	≤60%
Life test At rated voltage and 25°C.	10 years	10 years	10 years	10 years	10 years
Capacitance change % of rated value	≤20%	≤20%	≤20%	≤20%	≤20%
Internal resistance change % of rated value	≤100%	≤100%	≤100%	≤100%	≤100%
CYCLE LIFE					
Cycles Between specified voltage and half rated voltage under constant current at 25°C.	1 million	1 million	1 million	1 million	1 million
Capacitance change % of rated value	≤20%	≤20%	≤20%	≤20%	≤20%
Internal resistance change % of rated value	≤100%	≤100%	≤100%	≤100%	≤100%
SHELF LIFE					
Shelf Life Uncharged over storage temperature	2 years	2 years	2 years	2 years	2 years
Capacitance change % of rated value	10% decrease	10% decrease	10% decrease	10% decrease	10% decrease
ESR change % of rated value	50% increase	50% increase	50% increase	50% increase	50% increase
CURRENT					
Maximum continuous current	62 A	81 A	97 A	123 A	147 A
Maximum peak current, 1 sec	575 A	955 A	1,185 A	1,585 A	2,165 A
Leakage current, I_{LC} After 72 hours. Initial leakage current can be higher.	1.5 mA	2.7 mA	3.0 mA	4.2 mA	5.2 mA
CONNECTION					
Terminal	Threaded or Weldable				
SIZE					
Dimensions (L x W x H) (mm)	See drawings				
Weight	0.16kg	0.26kg	0.28kg	0.36kg	0.51kg

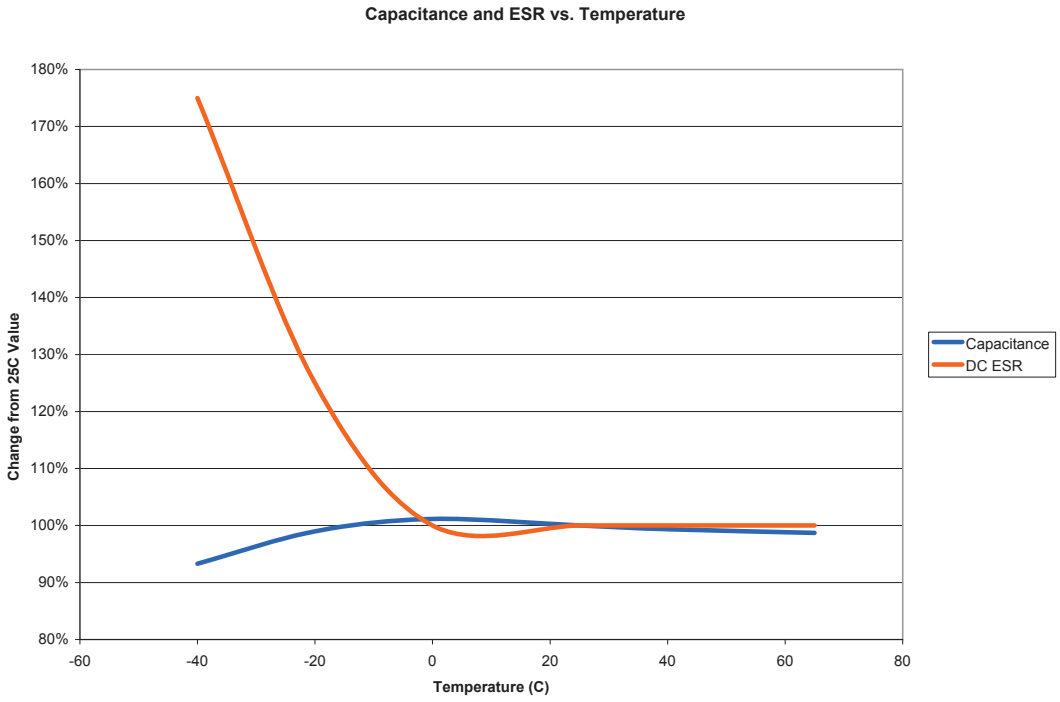
BCAP0650 P270
BCAP1200 P270
BCAP1500 P270
BCAP2000 P270
BCAP3000 P270

PRODUCT SPECIFICATIONS (cont.)

RATINGS AND SAFETY					
Vibration resistance	For all: ISO 16750, SAE J2380				
Short circuit current (Isc) **CAUTION:** Current possible with short circuit from rated voltage Do not use as an operating current.	3,350 A	4,650 A	5,700 A	7,700 A	9,300 A

TYPICAL CHARACTERISTICS

THERMAL CHARACTERISTICS					
Thermal resistance (Rth)	6.5°C/W	5.3°C/W	4.5°C/W	3.8°C/W	3.2°C/W



ADDITIONAL TECHNICAL INFORMATION

Capacitance and ESR, DC measured per document no. 1007239, available at www.maxwell.com.

Unless specified, all specifications are at 25°C

I_c = leakage current after 72 hours at 25°C

Isc (short circuit current) = $\frac{V_{RATED}}{ESR}$

R_{th} = thermal resistance

Emax = $\frac{½\,CV^2}{3{,}600 \times mass}$

Pd = $\frac{\frac{0.12V^2}{R\,(DC)}}{mass}$

Pmax = $\frac{\frac{V^2}{4R\,(1khz)}}{mass}$

Maximum Peak Current (1 sec) = $\frac{½\,V}{ESR(DC) + \frac{1}{C}}$

BCAP0650 P270
BCAP1200 P270
BCAP1500 P270
BCAP2000 P270
BCAP3000 P270

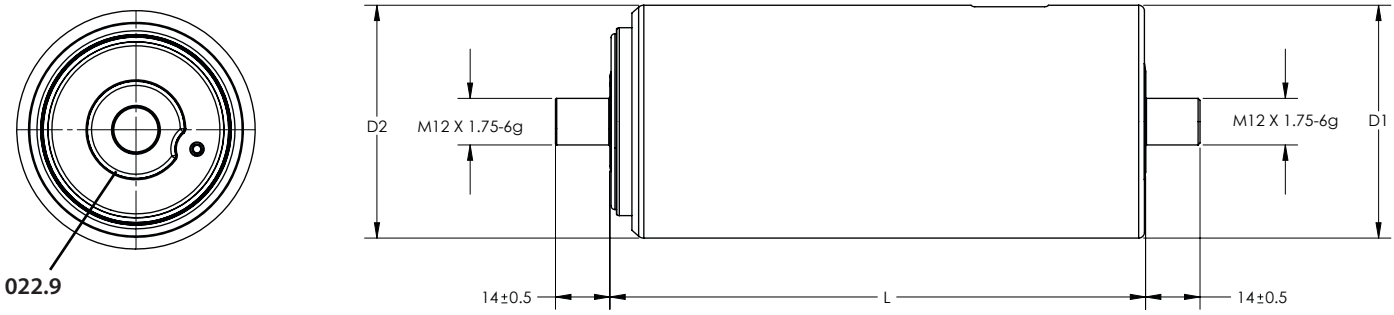
MOUNTING RECOMMENDATIONS

Do not reverse polarity.
Maximum torque for M12 screw terminals is 14Nm.
Cells are designed to be connected into series or parallel strings.
Clean terminals before mounting.

MARKINGS

Capacitors are marked with the following information - Rated capacitance and rated voltage as well as energy/ power type indication in the product naming. Serial number, name of manufacturer, positive and negative terminal, warning marking.

DIMENSIONS

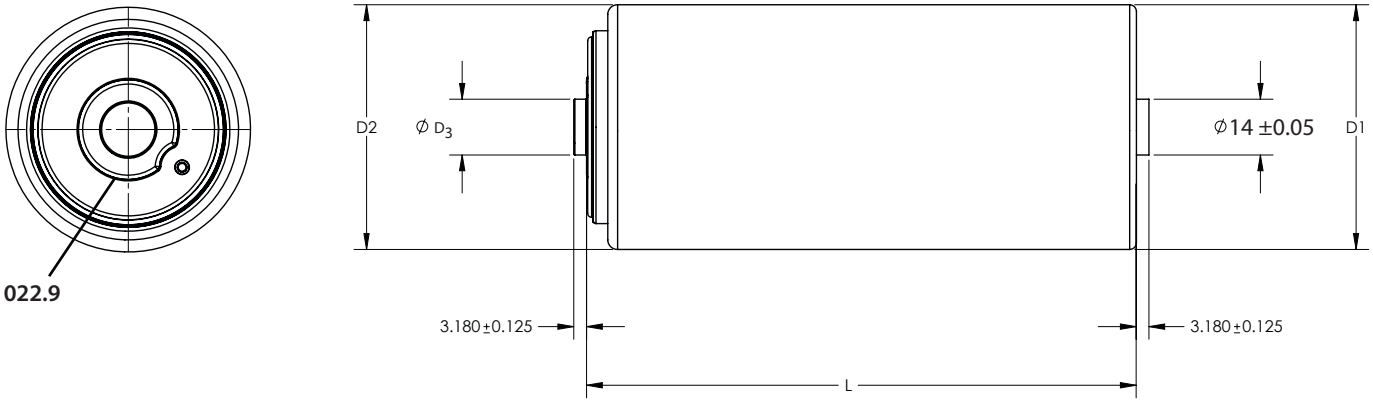


Part Number	Volume	L (±0.3mm)	D_1 (±0.2mm)	D_2 (±0.7mm)
BCAP0650 P270 K04 02	0.211 L	51.5 mm (±0.5mm)	60.4mm	60.7mm
BCAP1200 P270 K04 02	0.294 L	74 mm	60.4mm	60.7mm
BCAP1500 P270 K04 02	0.325 L	85 mm	60.4mm	60.7mm
BCAP2000 P270 K04 02	0.373 L	102 mm	60.4mm	60.7mm
BCAP3000 P270 K04 02	0.475 L	138 mm	60.4mm	60.7mm

Product dimensions are for reference only unless otherwise identified. Product dimensions and specifications may change without notice. Please contact Maxwell Technologies directly for any technical specifications critical to application.

BCAP0650 P270
BCAP1200 P270
BCAP1500 P270
BCAP2000 P270
BCAP3000 P270

DIMENSIONS (cont.)



Part Number	Volume	L (±0.3mm)	D_1 (±0.2mm)	D_2 (±0.7mm)	D_3 (±0.05mm)
BCAP0650 P270 K05 02	0.15 L	51.5 mm (±0.5mm)	60.4mm	60.7mm	14mm
BCAP1200 P270 K05 02	0.233 L	74 mm	60.4mm	60.7mm	14mm
BCAP1500 P270 K05 02	0.264 L	85 mm	60.4mm	60.7mm	14mm
BCAP2000 P270 K05 02	0.312 L	102 mm	60.4mm	60.7mm	14mm
BCAP3000 P270 K05 02	0.414 L	138 mm	60.4mm	60.7mm	14mm

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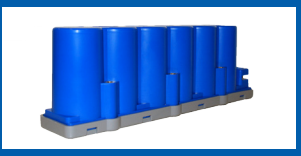
BMOD0058 E016 B02



FEATURES AND BENEFITS

- 16 V DC working voltage
- Individually balanced cells
- Compact, lightweight system
- Screw terminals
- RoHS compliant

TYPICAL APPLICATIONS

- Automotive subsystems
- Consumer electronics
- Portable power tools
- Renewable energy systems
- Short term UPS and telecom

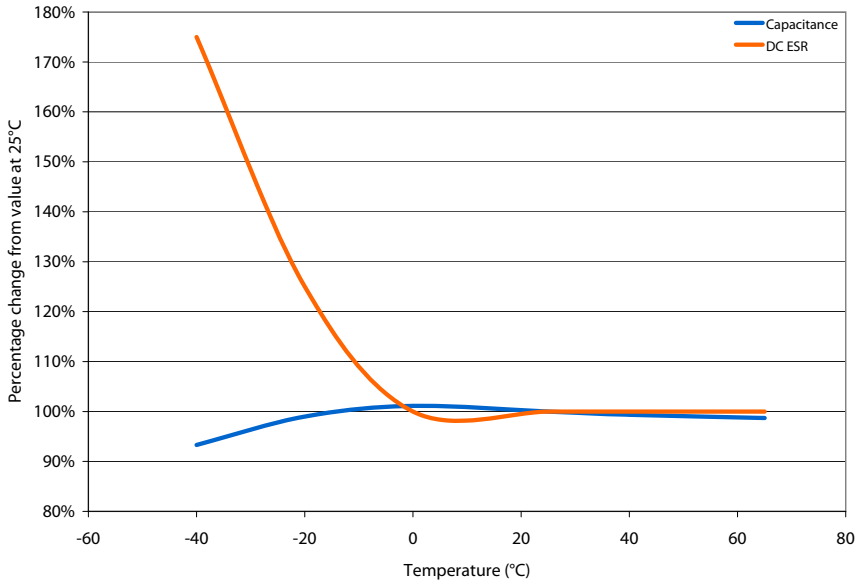
PRODUCT SPECIFICATIONS

ELECTRICAL	
Capacitance	
Nominal capacitance	58 F
Tolerance capacitance	- 0% / +20%
Voltage	
Rated voltage	16 V DC
Resistance	
ESR, DC (max., room temperature)	22 mΩ
ESR, AC (max., room temperature, 1kHz)	10 mΩ
Current	
Maximum continuous current	20 A
Maximum peak current, 1 sec.	204 A
Leakage current (After 72 hours at 25°C. Initial leakage current can be higher.)	50 mA
TEMPERATURE	
Operating temperature range (Cell case temperature)	-40°C to +65°C
Storage temperature range (Stored uncharged)	-40°C to + 70°C
POWER AND ENERGY	
Usable power density, Pd	2,220 W/kg
Usable power	1,400 W
Impedance match power density, Pmax	4,600 W/kg
Gravimetric energy density, Emax	3.3 Wh/kg
Energy available	2.1 Wh

DC LIFESPAN	
Endurance (at rated voltage and temperature)	2,000 hours
Capacitance change (% decrease from rated value)	≤20%
ESR change (% increase from rated value)	≤60%
Life Test (at rated voltage and 20°C)	10 years
Capacitance change (% decrease from rated value)	≤20%
ESR change (% increase from rated value)	≤100%
Cycle Test (Number of cycles)	500,000
Capacitance change (% decrease from rated value)	≤20%
ESR change (% increase from rated value)	≤100%
Shelf Life (Storage uncharged up to maximum storage temperature)	2 years
Capacitance change (% decrease from rated value)	10%
ESR change (% increase from rated value)	50%
CONNECTION	
Power output terminals	M5 Screw
Monitoring and control	N/A
Cell management	Passive
Maximum series voltage	640 V DC
PHYSICAL	
Dimensions	See drawing
Weight	0.63 kg
SAFETY	
Short circuit current (Current possible with short circuit from rated voltage. Do not use as an operating current.)	727 A
Certifications	RoHS
Surge voltage (voltage above this level can cause catastrophic failure)	16.8 V DC
Isolation voltage	2,500 V DC
ENVIRONMENTAL RATINGS	
Degrees of protection	IP54
Vibration resistance	IEC 60068-2-6
Shock resistance	IEC 60068-2-27, -29

TYPICAL CHARACTERISTICS

THERMAL CHARACTERISTICS



ADDITIONAL TECHNICAL INFORMATION

Capacitance and ESR, DC measured per document no. 1007239 available at www.maxwell.com.
Unless specified, all specifications are at 25°C.

Short circuit current (Isc) $= \frac{V_{RATED}}{ESR(DC)}$

Emax $= \frac{½\ CV^2}{3{,}600 \times mass}$

Pmax $= \frac{V^2}{4 \times ESR(DC) \times mass}$

Pd $= \frac{0.12V^2}{ESR(DC) \times mass}$

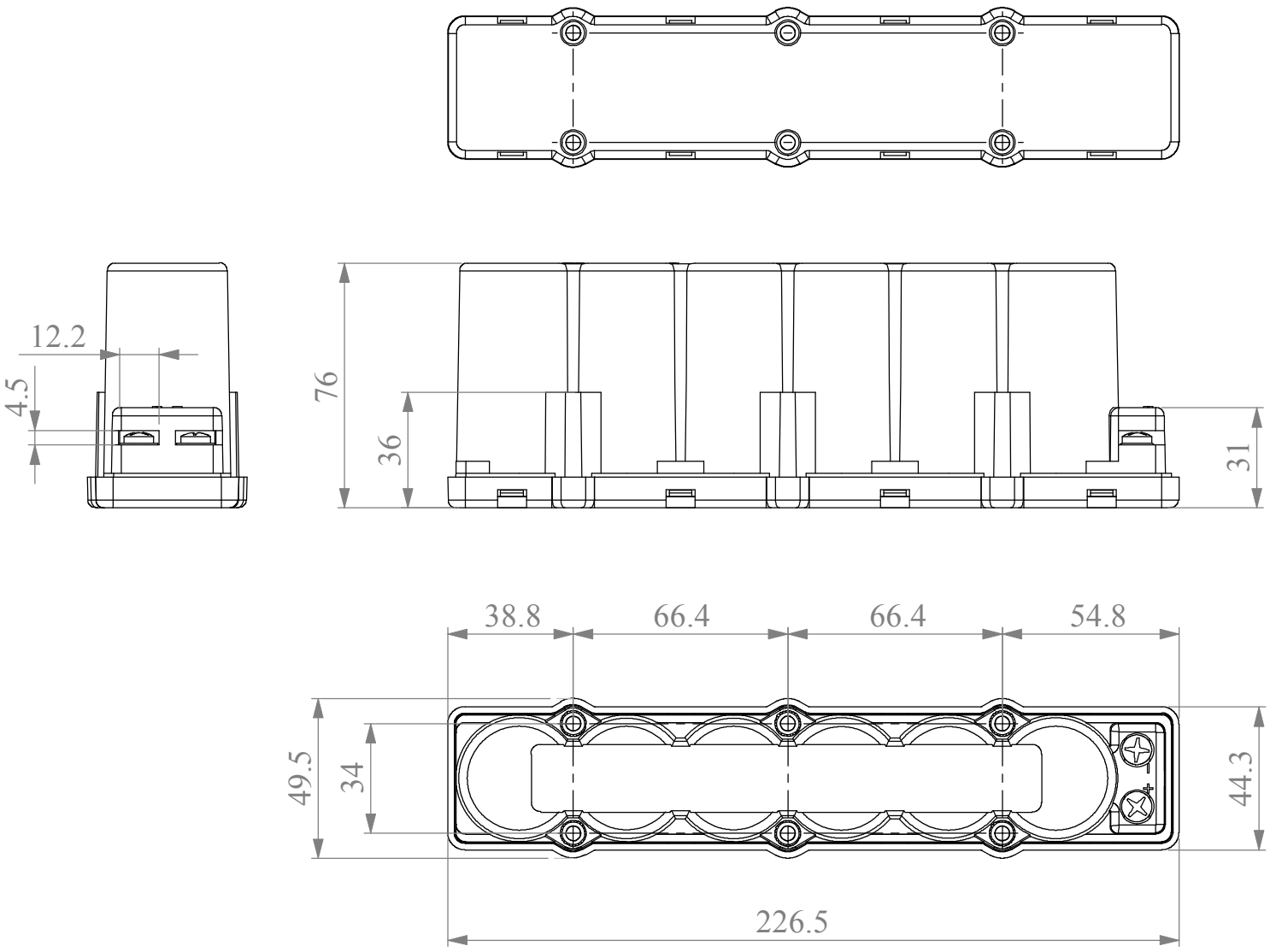
Maximum peak current (1 sec) $= \frac{½\ CV}{C \times ESR(DC) + 1}$

MOUNTING RECOMMENDATIONS

Do not reverse polarity. Mount with M4 screws, 40mm minimum length. Modules are designed to be connected into series or parallel strings. Clean terminals before mounting.

MARKINGS

Products are marked with the following information: Rated capacitance, rated voltage, product number, name of manufacturer, positive and negative terminal, warning marking, serial number.



Part Description	Dimensions (mm)			Package Quantity
	L (±0.5mm)	W (±0.5mm)	H (±0.5mm)	
BMOD0058 E016 B02	226.5	49.5	76.0	10

Product dimensions are for reference only unless otherwise identified. Product dimensions and specifications may change without notice.
Please contact Maxwell Technologies directly for any technical specifications critical to application.

DATASHEET
K2 BMOD POWER SERIES 16 V MODULES

BMOD0110 P016 B01
BMOD0250 P016 B01
BMOD0500 P016 B01
BMOD0500 P016 B02

FEATURES AND BENEFITS

- Ultra-low internal resistance
- Highest power performance available
- Lowest time constant
- 16.2 V operating voltage
- Over 1,000,000 duty cycles
- Individually balanced cells
- Voltage and temperature sensor output included
- Compact, rugged, fully enclosed splash proof design

APPLICATIONS

- Transportation
- Automotive
- Industrial
- Uninterruptible Power Supplies (UPS)
- Telecommunication

PRODUCT SPECIFICATIONS

CAPACITANCE	BMOD0110	BMOD0250	BMOD0500 B01	BMOD0500 B02
Nominal capacitance	110 F	250 F	500 F	500 F
Tolerance capacitance	+20%			
VOLTAGE				
Rated voltage	16.2 V DC			
Surge voltage	16.8 V DC			
Maximum operating voltage	750 V DC			
Isolation voltage[1]	2,500 V AC			
RESISTANCE				
ESR, DC[2]	5.4 mΩ	4.1 mΩ	2.4 mΩ	2.4 mΩ
Resistance tolerance	Max.			
Thermal resistance (Rth)	1.1°C/W	0.91°C/W	0.5°C/W	0.5°C/W
TEMPERATURE				
Operating temperature range	-40°C to +65°C			
Storage temperature range	-40°C to +70°C			
Temperature characteristics				
Capacitance change	± 5% at 25°C (at -40°C)			
Internal resistance change	± 150% at 25°C (at -40°C)			
POWER				
Pd	2,300 W/kg	1,700 W/kg	2,700 W/kg	2,300 W/kg
Pmax	6,000 W/kg	4,400 W/kg	6,700 W/kg	6,700 W/kg
ENERGY				
Emax	1.49 Wh/kg	2.05 Wh/kg	3.17 Wh/kg	3.17 Wh/kg
LIFESPAN				
Endurance After 1,500 hours application of rated voltage at 65°C. Within % of initial specified value.				
Capacitance change	<20% decrease			
Internal resistance change	<60% increase			
Shelf life	After 1,500 hours storage at 65°C without load shall meet specification for endurance.			

BMOD0110 P016 B01
BMOD0250 P016 B01
BMOD0500 P016 B01
BMOD0500 P016 B02

Life test After 10 years at rated voltage and 25°C. Within % of initial specified value.				
Capacitance change	30% decrease			
Internal resistance	150% increase			
CYCLES				
Cycle test Capacitors cycled between specified voltage and half rated voltage under constant current at 25°C (1,000,000).				
Capacitance change Within % of initial specified value.	30% decrease			
Internal resistance Within % of initial specified value.	150% increase			
CURRENT	**BMOD0110**	**BMOD0250**	**BMOD0500 B01**	**BMOD0500 B02**
Leakage current [3]	1.5 mA	3.0 mA	5.2 mA	150 mA
Short circuit current (Isc) [4]	3,500 A	3,900 A	4,800 A	4,800 A
Maximum continuous current	30 A	115 A	150 A	150 A
Maximum peak current, 1 sec		2,000 A	4,000 A	4,000 A
CONNECTION				
Terminal	Screw			
MONITORING (IN-BUILT)				
Balancing[5]	VMS	VMS	VMS	Passive
Thermal monitoring	NTC			
SIZE				
Dimensions (L x W x H) (mm) (±0.5mm)	See drawings			
Weight	2.7 kg	4.45 kg	5.75 kg	5.75 kg
RATINGS				
Humidity resistance	IP65			
Vibration resistance	N/A	SAE J2380	SAE J2380	SAE J2380

[1] 50Hz, 1 min. Maximum string operating voltage 1,500 V DC.
[2] Max., room temperature.
[3] After 72 hours at 25°C. Initial leakage current can be higher.
[4] **CAUTION:** C urrent possible with short circuit from UR. Do not use as an operating current.
[5] VMS = Maxwell Technologies Voltage Management System.

MOUNTING RECOMMENDATIONS

BMOD0110 modules can be secured at 4 locations at provided holes for M6 bolts. Follow user manual instructions for terminal, balance and output connections.

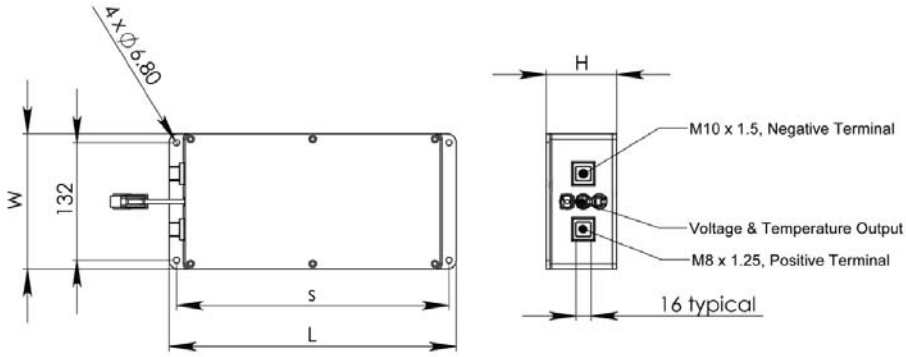
BMOD0250 and **BMOD0500** modules can be secured at 8 locations, 4 front face and/or 4 bottom face, at provided holes for M6 bolts. Follow user manual instructions for terminal, balance and output connections.

MARKINGS

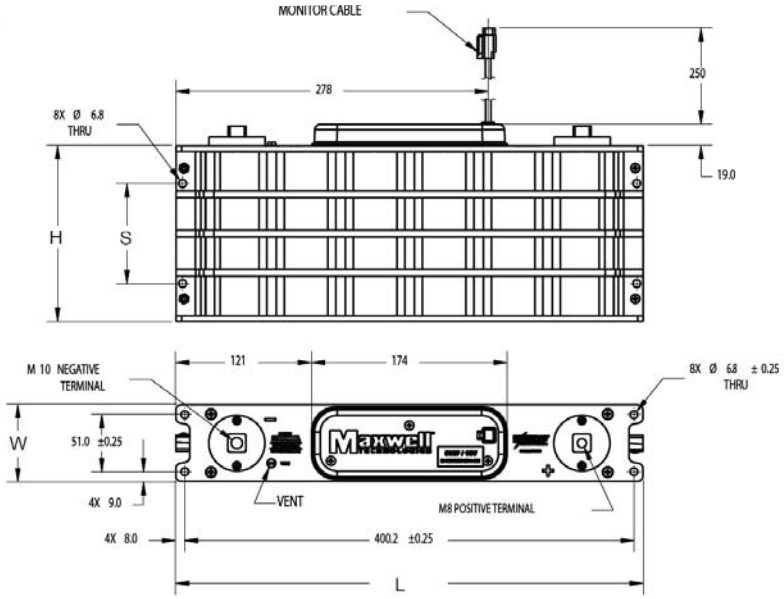
Modules are marked with the following information: Rated capacitance, rated voltage, product number, name of manufacturer, positive and negative terminal, warning marking, serial number.

BMOD0110 P016 B01
BMOD0250 P016 B01
BMOD0500 P016 B01
BMOD0500 P016 B02

DIMENSIONS (mm)



Part number	L (±0.25mm)	W (±0.25mm)	H (±0.5mm)	s (±0.5mm)
BMOD0110 P016 B01	260.1	154.9	79.3	240.0



Part number	L (±0.25mm)	W (±0.25mm)	H (±0.5mm)	s (±0.5mm)
BMOD0250 P016 B01	416.2	67.2	103.2	53.7
BMOD0500 P016 B01	416.2	67.2	156.7	89.3
BMOD0500 P016 B02	416.2	67.2	156.7	89.3

Product dimensions are for reference only unless otherwise identified. Product dimensions and specifications may change without notice. Please contact Maxwell Technologies directly for any technical specifications critical to application.

BMOD0083 P048
BMOD0110 P048
BMOD0165 P048

TYPICAL FEATURES AND BENEFITS

- Ultra-low internal resistance
- Highest power performance available
- Lowest time constant
- 48.6 V operating voltage
- Individually balanced cells
- Over 1,000,000 duty cycles
- Voltage and temperature sensor output included
- Compact, rugged, fully enclosed splash-proof design

TYPICAL APPLICATIONS

- Transportation
- Automotive
- Industrial
- UPS
- Telecommunication

PRODUCT SPECIFICATIONS

CAPACITANCE	BMOD0083	BMOD0110	BMOD0165
Nominal capacitance	80 F	110 F	165 F
Tolerance capacitance	+20% / -5%	+20% / -5%	+20% / -5%
VOLTAGE			
Rated voltage	48.6 V DC	48.6 V DC	48.6 V DC
Surge voltage	50.4 V DC	50.4 V DC	50.4 V DC
Maximum operating voltage	750 V DC	750 V DC	750 V DC
Isolation voltage	2,500 V DC	2,500 V DC	2,500 V DC
RESISTANCE			
ESR, DC Max., room temperature	12.3 mΩ	8.1 mΩ	7.1 mΩ
Resistance tolerance	Max.	Max.	Max.
Thermal resistance (Rth)	0.39°C/W	0.30°C/W	0.25v
TEMPERATURE			
Operating temperature range	-40°C to +65°C	-40°C to +65°C	-40°C to +65°C
Storage temperature range	-40°C to +70°C	-40°C to +70°C	-40°C to +70°C
Temperature characteristics			
Capacitance change % at 25° C (at -40°C)	± 5%	± 5%	± 5%
Internal resistance change % at 25° C (at -40°C)	± 150%	± 150%	± 150%
POWER			
Pd	2,000 W/kg	2,900 W/kg	3,200 W/kg
Pmax	5,400 W/kg	8,800 W/kg	7,900 W/kg
ENERGY			
Emax	2.48 Wh/kg	3.01 Wh/kg	3.81 Wh/kg
LIFESPAN			
Endurance After 1,500 hours application of rated voltage at 65°C. Within % of initial specified value.			
Capacitance change	<20% decrease	<20% decrease	<20% decrease
Internal resistance change	<60% increase	<60% increase	<60% increase

BMOD0083 P048
BMOD0110 P048
BMOD0165 P048

PRODUCT SPECIFICATIONS (cont.)

	BMOD0083	BMOD0110	BMOD0165
Life test At rated voltage and 25°C.	10 years	10 years	10 years
Capacitance change % of rated value	30% decrease	30% decrease	30% decrease
Internal resistance % of rated value	150% increase	150% increase	150% increase
Shelf Life	After 1,500 hours storage at 65°C without load shall meet specification for endurance.		
LIFE CYCLE			
Cycles Between specified voltage and half rated voltage under constant current at 25°C.	1,000,000	1,000,000	1,000,000
Capacitance change	30% decrease	30% decrease	30% decrease
Internal resistance	150% increase	150% increase	150% increase
CURRENT			
Leakage current After 72 hours at 25°C. Initial leakage current can be higher.	3 mA	4.2mA	5.2 mA
Short circuit current (Isc) **CAUTION:** C urrent possible with short circuit from UR. Do not use as an operating current.	4,700 A	6,000 A	6,900 A
Maximum continuous current	115 A	125 A	150 A
Maximum peak current, 1 sec 1 second, 10% duty cycle	1,080 A	1,410 A	1,850 A
CONNECTION			
Terminal	+ M8 x1.25/ - M10 x1.5	+ M8 x1.25/ - M10 x1.5	+ M8 x1.25/ - M10 x1.5
MONITORING			
Balancing	VMS (Voltage Management System)	VMS (Voltage Management System)	VMS (Voltage Management System)
Fan voltage	N/A	N/A	N/A
Thermal monitoring	NTC	NTC	NTC
SIZE			
Dimensions	See drawing	See drawing	See drawing
Volume	8.5 L	9.7 L	12.6 L
Weight	11 kg	12 kg	14.2 kg
RATINGS			
Environmental resistance	IP65	IP65	IP65
Vibration resistance	SAE J2380	SAE J2380	SAE J2380

ADDITIONAL TECHNICAL INFORMATION

Capacitance and ESR, DC measured per document no. 1007239, available at www.maxwell.com.

I_c = leakage current after 72 hours at 25°C

Isc (short circuit current) = $\frac{V_{RATED}}{ESR\ DC}$

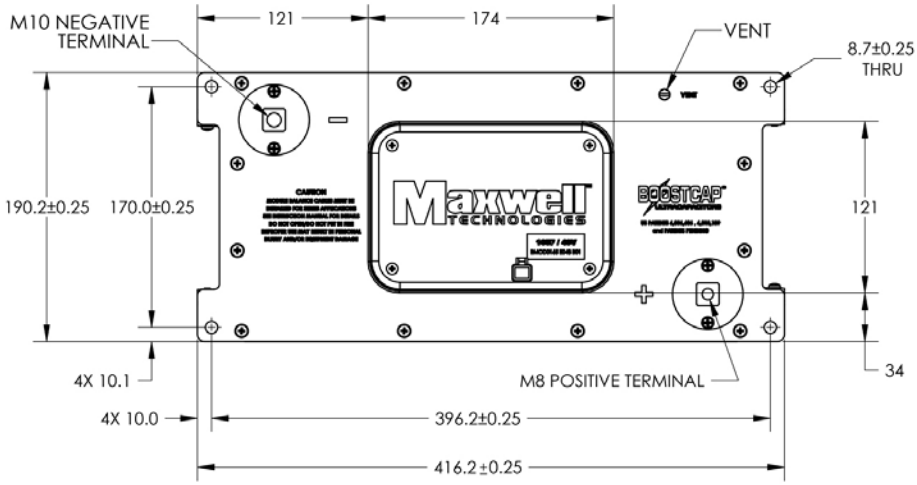
R_{th} = thermal resistance

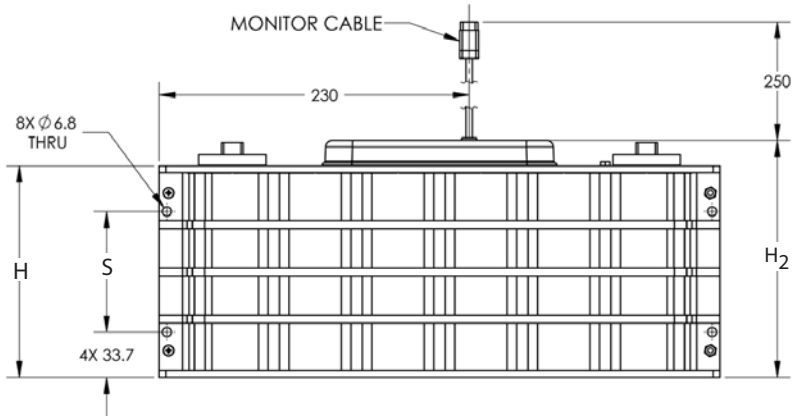
$$Pd = \frac{\frac{0.12V^2}{R\ (DC)}}{mass}$$

$$Pmax = \frac{\frac{V^2}{4R\ (1khz)}}{mass}$$

$$Emax = \frac{\frac{1}{2}\ CV^2}{3{,}600 \times mass}$$

BMOD0083 P048
BMOD0110 P048
BMOD0165 P048





DIMENSIONS (mm)

Part number	L (±0.25mm)	W (±0.25mm)	H (±0.25mm)	H_2 (±0.25mm)	s (±0.5mm)
BMOD0083 P048	416.2	190.2	103.2	126	53.7
BMOD0110 P048	416.2	190.2	120.2	143	70.7
BMOD0165 P048	416.2	190.2	156.7	180	89.3

Product dimensions are for reference only unless otherwise identified. Product dimensions and specifications may change without notice.
Please contact Maxwell Technologies directly for any technical specifications critical to application.

MOUNTING RECOMMENDATIONS

Modules can be secured at 8 locations, 4 front face and/or 4 bottom face, at provided holes for M8 bolt. Follow user manual instructions for terminal, balance and output connections.

MARKINGS

Modules are marked with the following information: Rated capacitance, rated voltage, product number, name of manufacturer, positive and negative terminal, warning marking, serial number.

BMOD0020 P075

PRODUCT SPECIFICATIONS

CAPACITANCE	
Nominal capacitance	20 F
Tolerance capacitance	+20% / -0%
VOLTAGE	
Rated voltage	75 V DC
Surge voltage	90 V DC
Maximum operating voltage	86 V DC
Isolation voltage	2,500 V AC
RESISTANCE	
ESR, DC	25.6 mΩ
Resistance tolerance	Max.
TEMPERATURE	
Operating temperature range	-40°C to +65°C
Storage temperature range	-40°C to +70°C
Temperature characteristics[1]	
Capacitance change	± 5% at 25° C
Internal resistance change	± 150% at 25° C
POWER	
Pd	TBD
Pmax	TBD
ENERGY	
Emax	TBD
Energy available	11.7 Wh
LIFESPAN	
Lifetime 75 V DC, RT[7]	150,000 hours
Endurance[2]	
Capacitance change	20% decrease
Internal resistance change	60% increase
Life test[3]	
Capacitance change	20% decrease
Internal resistance	100% increase
CYCLES	
Cycles 75 V to 37.5 V DC, RT[7]	1,000,000
Capacitance change[4]	30% decrease
Internal resistance[4]	150% increase
CURRENT	
Leakage current[5]	150 mA
Short circuit current (Isc) [6]	4,800 A
Maximum continuous current	50 A
Maximum peak current, 1 sec	150 A
CONNECTION	
Terminal	Screw
MONITORING (IN-BUILT)	
Balancing	Passive
Thermal monitoring	PT100
SIZE	
Dimensions (L x W x H) (mm) (±0.5mm)	762 x 425 x 265
Weight	TBD
RATINGS	
Humidity resistance	IP54
Vibration resistance	SAE J2380

1 Within ± #% of initial measured value at #°C.
2 After 1,500 hours application of rated voltage at 65°C. Within % of initial specified value.
3 After 10 years at rated voltage and 25°C. Within % of initial specified value.
4 Within % of initial specified value.
5 After 72 hours at 25°C. Initial leakage current can be higher.
6 **CAUTION:** C urrent possible with short circuit from UR. Do not use as an operating current.
7 End of life charazterized as -20°C from nominal C, or increase of 100% in ESR.

PRELIMINARY

BMOD0020 P075

FEATURES AND BENEFITS

- Ultra-low internal resistance
- Highest power performance available
- Lowest time constant
- 75 V operating voltage
- Temperature monitoring
- Over 1,000,000 duty cycles
- Water, dust and vibration resistance with IP54 and SAEJ 2380 compliance
- Passive balancing

APPLICATIONS

- Grid / Power Quality
- UPS / Backup for Heavy Machinery
- Wind Turbine Pitch Systems

INCLUDED IN BMOD0020 P075

2 Power connectors:

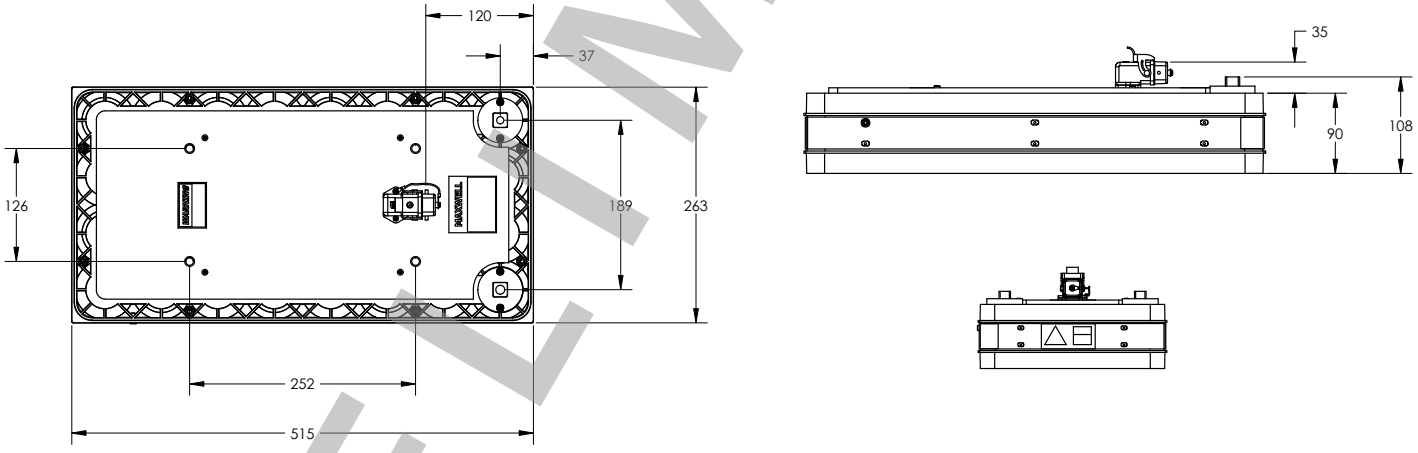
- 1x M8 (positive), 1x M10 (negative)
- Threaded aluminum

1 Monitoring connector

- Harting® HAN 09 37 003 0801 (base), 09 36 008 3001(insert)
- Thermal monitoring through PT100 Minco S17624PDYT20B

MARKINGS

Modules are marked with the following information: Rated capacitance, rated voltage, product number, name of manufacturer, positive and negative terminal, warning marking, serial number.



Part Number	Mass	L (±1.0mm)	W (±1.0mm)	H (±1.0mm)
BMOD0020 P270 B02	TBD	515mm	263mm	211mm

Product dimensions are for reference only unless otherwise identified. Product dimensions and specifications may change without notice. Please contact Maxwell Technologies directly for any technical specifications critical to application.

PRELIMINARY

BMOD0094 P075 B02

PRODUCT SPECIFICATIONS

CAPACITANCE	
Nominal capacitance	94 F
Tolerance capacitance	+20% / -0%
VOLTAGE	
Rated voltage	75 V DC
Surge voltage	90 V DC
Maximum operating voltage	86 V DC
Isolation voltage 50Hz, 1 min. Maximum string operating voltage 1,500 V DC	2,500 V AC
RESISTANCE	
ESR, DC Max., room temperature	15 mΩ
Resistance tolerance	Max.
Thermal resistance (Rth)	N/A
TEMPERATURE	
Operating temperature range	-40°C to +65°C
Storage temperature range	-40°C to +70°C
Temperature characteristics	
Capacitance change	± 5% at 25°C
Internal resistance change	± 150% at 25°C
POWER	
Pd	2,400 W/kg
Pmax	6,800 W/kg
ENERGY	
Emax	3.98 Wh/kg
Energy available Energy Available equals 1/2C (Vnom^2 – 1/2Vnom^2) /3600	55 Wh
LIFESPAN	
Lifetime 75 V DC, RT End of life characterized as -20% C from nominal C, or increase of 100% in ESR	150,000 hours
Endurance	
Capacitance change	<20% decrease
Internal resistance change	<60% increase
Life test	
Capacitance change	20% decrease
Internal resistance	100% increase

CYCLES	
Cycle life 75 to 37.5 V DC, RT	1,000,000
Capacitance change	30% decrease
Internal resistance	150% increase
CURRENT	
Leakage current	150 mA
Short circuit current (Isc)	4,800 A
Maximum continuous current	50 A
Maximum peak current, 1 sec 1 second, 10% duty cycle	150 A
Self discharge % of initial V; 29 hours RT 75V; 12 hours charge and hold	50%
CONNECTION	
Terminal	Screw
MONITORING (IN-BUILT)	
Balancing	Passive
Fan voltage	N/A
Thermal monitoring	PT100
SIZE	
Dimensions (L x W x H) (mm) (±0.5mm)	515 x 211 x 263
Weight	25 kg
RATINGS	
Humidity resistance	IP54
Vibration resistance	SAE J2380

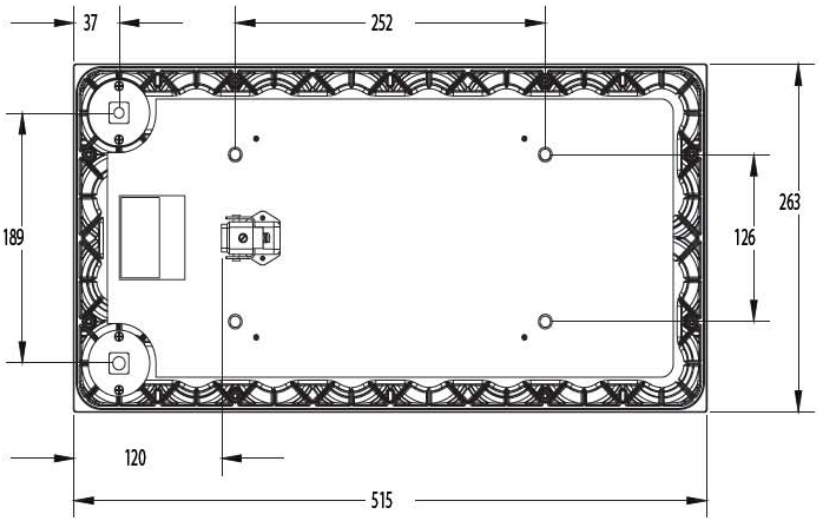
TYPICAL FEATURES AND BENEFITS

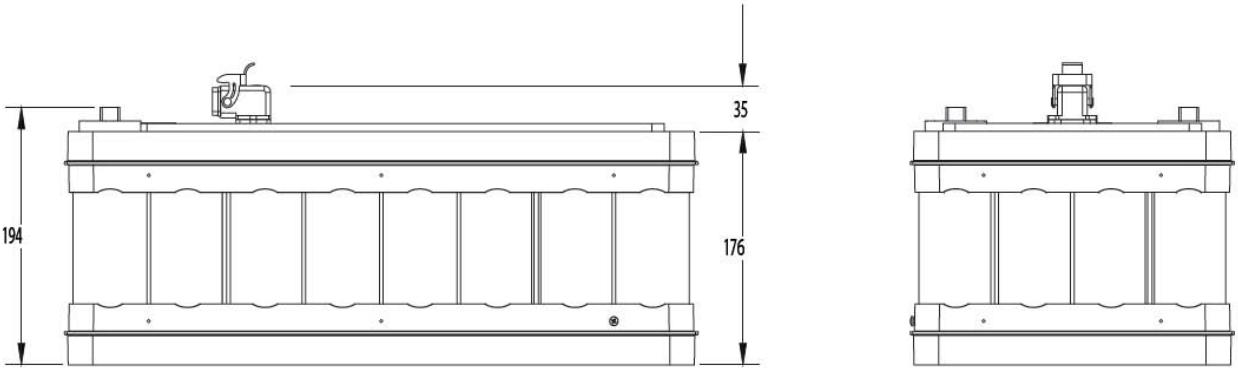
- Ultra-low internal resistance
- Highest power performance available
- Lowest time constant
- 75 V operating voltage
- Temperature monitoring
- Over 1,000,000 duty cycles
- Water, dust and vibrations resistant with IP54 and SAE J2380 compliance

TYPICAL APPLICATIONS

- Grid / Power quality
- UPS / Backup for heavy machinery
- Wind turbine pitch systems

BMOD0094 P075 B02





Product dimensions are in mm and for reference only unless otherwise identified. Product dimensions and specifications may change without notice. Please contact Maxwell Technologies directly for any technical specifications critical to application.

INCLUDED IN BMOD0063 P125

2 power connectors; threaded aluminium:

- 1x M8 (positive)
- 1x M10 (negative)

1 Monitoring connector:

- Harting® HAN 09 37 003 0801 (base), 09 36 008 3001 (insert) Thermal monitoring through PT100 Minco S17624PDYT20B

MARKINGS

Modules are marked with the following information: Rated capacitance, rated voltage, product number, name of manufacturer, positive and negative terminal, warning marking, serial number.

BMOD0063 P125 B14/B24/B04
BMOD0063 P125 B33

FEATURES AND BENEFITS

- CAN Bus digital monitoring and communications
- Highest power performance available
- Over 1,000,000 duty cycles
- Temperature and voltage monitoring
- Ultra-low internal resistance
- Shock and vibration immunity (ISO16750:T14, EN61373)

TYPICAL APPLICATIONS

- Buses
- Electric trains and trolleys
- Heavy duty transportation
- Cranes, RTGS
- Utility vehicles
- Mining Equipment

PRODUCT SPECIFICATIONS

CAPACITANCE	B04/B14/B24/B33
Nominal capacitance	63 F
Tolerance capacitance	+20% / -0%
VOLTAGE	
Rated voltage	125 V DC
Surge voltage	135 V DC
Maximum operating voltage	130 V DC
Isolation voltage 50Hz, 1 min. Maximum string operating voltage 1,500 V DC	4,000 V DC
RESISTANCE	
ESR, DC Max., room temperature	18 mΩ
Resistance tolerance	Max.
Thermal resistance (Rth)	0.032°C/W
TEMPERATURE	
Operating temperature range	-40°C to +65°C
Max. ambient operating temp.	+50°C
Storage temperature range	-40°C to +70°C
Temperature characteristics	
Capacitance change	± 5% at 25° C
Internal resistance change	± 150% at 25° C
POWER	
Pd	1,750 W/kg
Pmax	4,700 W/kg
ENERGY	
Emax	2.53 Wh/kg
Energy available Energy Available equals 1/2C (Vnom^2 – 1/2Vnom^2) /3600	101.7 Wh
CYCLES	
Cycles 125 V to 62.5 V DC, RT	1,000,000
Capacitance change Within % of initial specified value.	20% decrease
Internal resistance Within % of initial specified value.	100% increase

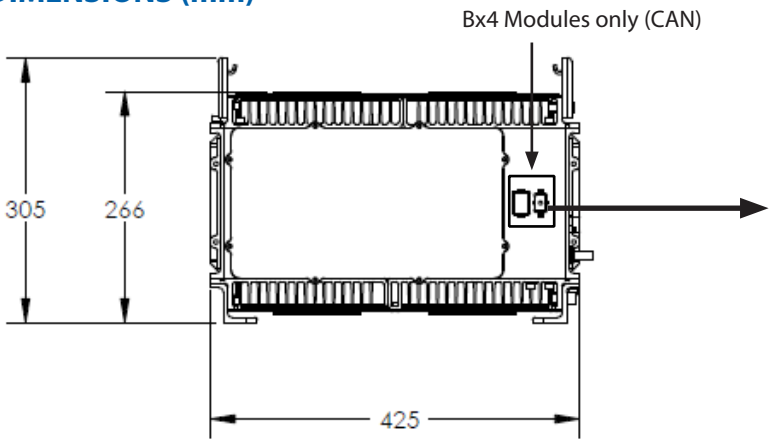
BMOD0063 P125 B14/B24/B04
BMOD0063 P125 B33

PRODUCT SPECIFICATIONS (cont.)

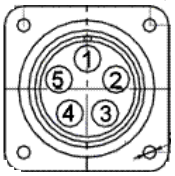
LIFESPAN	B04/B14/B24/B33
Lifetime 125 V DC, RT End of life characterized as -20% C from nominal C, or increase of 100% in ESR	100,000 hours
Endurance After 1,500 hours application of rated voltage at 65°C. Within % of initial specified value.	
Capacitance change	<20% decrease
Internal resistance change	<60% increase
Life test After 10 years at rated voltage and 25°C. Within % of initial specified value.	
Capacitance change	20% decrease
Internal resistance	100% increase
CURRENT	
Leakage current After 72 hours at 25°C. Initial leakage current can be higher.	5.2 mA
Maximum continuous current	150 A
Maximum peak current, 1 sec 1 second, 10% duty cycle	750 A
Maximum continuous current with fan cooling Assuming 15°C temperature rise above ambient temperature	150 A
Maximum continuous current with passive cooling Assuming 15°C temperature rise above ambient temperature	55 A
Self discharge % of initial V, 30 days RT 100V; 12 hours charge and hold	50%
CONNECTION	
Power terminal	Radsok®
Communications	See page 3
MONITORING	
Cell balancing	VMS (Maxwell Technologies® Voltage Management System)
Voltage and Temperature Monitoring	CANBus SAE J1939 (B14/B24/B04) Analog (B33)
SIZE	
Dimensions (L x W x H) (mm) (±0.5mm)	762 x 425 x 265 (B14/B24/B33) 619 x 425 x 265 (B04)
Weight	59.5 kg
RATINGS	
Fan power Max. each fan	12V / 42W (B14) 24V / 55W (B24/B33) No Fan (B04)
Humidity resistance	IP65; IP55 (fans)
Shock resistance	SAE J2464
Vibration resistance	EN 61373; ISO16750 Table 14

BMOD0063 P125 B14/B24/B04
BMOD0063 P125 B33

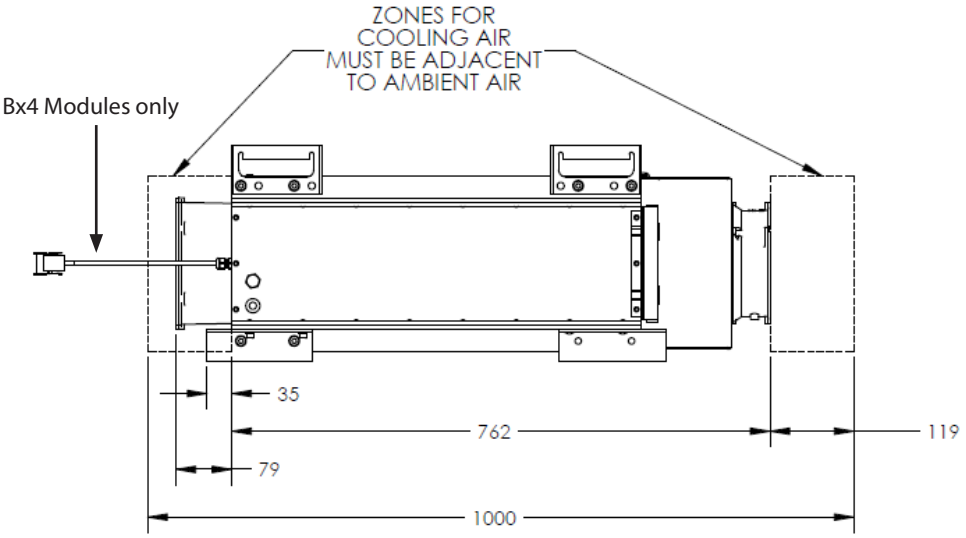
DIMENSIONS (mm)



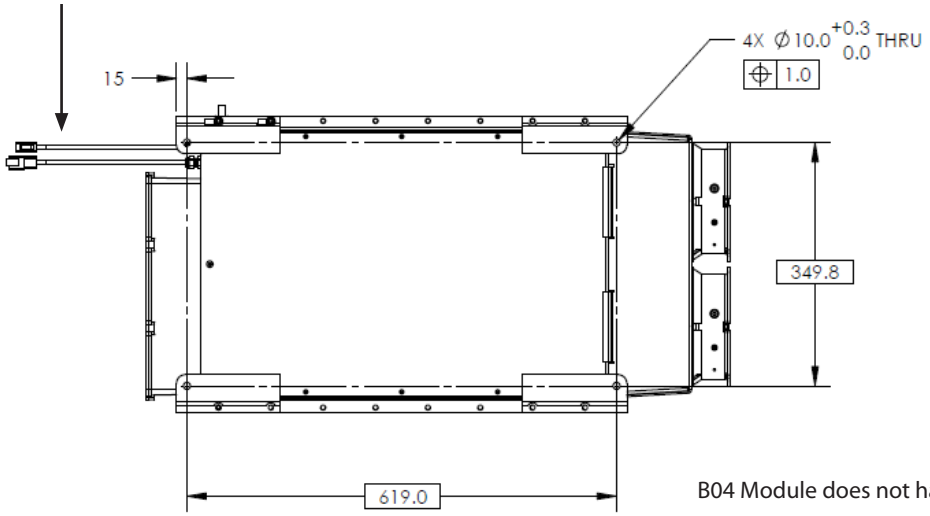
B33 Module only



Pin	Pin Assignment
1	Center Tap Voltage
2	Positive Tap Voltage
3	Temperature Sensor Lead 1 or 2
4	Temperature Sensor Lead 2 or 1
5	Negative Tap Voltage



Bx4 Modules only



B04 Module does not have fan

Product dimensions are for reference only unless otherwise identified. Product dimensions and specifications may change without notice.
Please contact Maxwell Technologies directly for any technical specifications critical to application. *Drawing no. 1014553*

BMOD0063 P125 B14/B24/B04
BMOD0063 P125 B33

INCLUDED IN BMOD0063 P125

2 Power connectors:

- Mounting adapters with isolation and mating lug connectors
- Adapters for normal / perpendicular mounting of power cables (AUG 1/0)

1 CAN bus serial communications connector, male, Deutsch DTM04-08PA with WM-8D and 0462-201-20141 (B04/B14/B24)

1 CAN bus serial communications connector, female, Deutsch DTM06-08SA with WM-8S and 0460-201-20141 (B04/B14/B24)

1 ANALOG, 5 pin connecter (B33)

MOUNTING RECOMMENDATIONS

The module should be mounted to a strong chassis surface with four 6-32, or M4 screws. The mounting screws should have a mechanical locking method that is appropriate for the vibration levels. To provide the best possible EMI protection, the mounting surface should be electrically grounded. Do not reverse polarize.
The use of alternate module mounting orientations or custom feet other than those provided by Maxwell Technologies will result in voiding the warranty unless such uses have been disclosed to Maxwell and approved by Maxwell by express written consent prior to implementation.

MARKINGS

Modules are marked with the following information: Rated capacitance, rated voltage, product number, name of manufacturer, positive and negative terminal, warning marking, serial number.

Disclaimer of Warranty/Limitation of Liability

for Uses in Life Support Devices or Critical Systems

Maxwell Technologies, Inc. and its Affiliates (“Maxwell”) provide no warranties of any kind either express or implied, including (without limitation) the implied warranties of merchantability and fitness, for uses of its products as components in life support devices or critical systems.

“Life support devices” are devices or systems, which (a) are intended for surgical implant into a living body, or (b) support or sustain life, and whose failure to perform when properly used in accordance with the instructions provided in the labeling can be reasonably expected to result in bodily injury to the user. An example of a life support device includes, but is not limited to, a heart pacemaker.

A “critical system” is any system whose failure to perform can affect the safety or effectiveness of a higher level system, or cause bodily or property injury by loss of control of the higher level device or system. An example of a critical system includes, but is not limited to, aircraft avionics.

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